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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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First Named Applicant: Chan	Art Unit: 2613
Serial No.: 09/932,127	Examiner: Lee
Filed: August 16, 2001	50R4781
For: ERROR CONCEALMENT OF VIDEO DATA USING TEXTURE DATA RECOVERY	July 27, 2004 750 B STREET, Suite 3120 San Diego, CA 92101

RESPONSE TO OFFICE ACTION

Commissioner of Patents and Trademarks
Washington, DC 20231

Dear Sir:

In response to the Office Action dated June 10, 2004, please amend allowable Claim 9 to be in independent form as indicated below. New Claim 26 has also been added.

The following remarks are submitted. Claims 1-3, 5-8, 11-14, and 17-25 have been rejected under 35 U.S.C. §103 as being obvious over Brailean et al. (USPN 5,724,369) in view of Zhao et al. (USPA 2003/0067981), and Claims 4, 15, and 16 have been rejected under 35 U.S.C. §103 as being obvious over Brailean et al. in view of Zhao et al. and further in view of Talluri et al. (USPN 6,111,916). Claims 9 and 10 have been indicated as reciting allowable subject matter.

It is respectfully submitted that the proposed combination of references would not arrive at, e.g., Claim 1, which requires evaluating smoothness of error concealment starting at a particular macroblock, then successively adding one macroblock at a time, evaluating, and so on until all macroblocks in the texture

partition have been evaluated. That is simply an entirely new concept that nothing in the relied-upon references teaches or suggests.

More specifically, contrary to the allegation on the top of page 3 of the Office Action, all Brailean et al. does is to run through motion vectors from a neighboring uncorrupted macroblock to select the best one to use in error concealment, see, e.g., Brailean et al. abstract, last sentence. There is no iterative concealment and evaluation in Brailean et al., much less the agglomerative evaluation of different groups of macroblocks of, e.g., Claim 1. Brailean et al. simply does not teach or suggest evaluating image smoothness for successive groups of macroblocks, with each group having one more macroblock added to it from the previous group, until all groups have been evaluated and the best one chosen. The secondary reference is even further afield, since all Zhao et al. does is replace an erroneous macroblock with a macroblock from a previous frame, see Zhao et al. [0172].

Indeed, the very portions of Brailean et al. that have been relied on in the present rejections militate towards patentability. For instance, col. 3, lines 25-32 of Brailean et al. (used as a teaching of the presently claimed iteration) specifically teach that error concealment is achieved not by evaluating successively larger groups of macroblocks but simply by selecting the best motion vector from a neighboring uncorrupted macroblock. Selecting one of several motion vectors and then undertaking a single error concealment using that vector is not close to concealing an error at a particular macroblock where error is detected, and then repeating with one more macroblock added prior to the previous particular macroblock until all macroblocks in the texture partition have been concealed, with the best set of macroblocks being selected at the end of the iterative process for concealment.

The case for patentability of the present claims being so compelling, allowance is earnestly solicited. The Examiner is cordially invited to telephone the undersigned at (619) 338-8075 for any reason which would advance the instant application to allowance.

Respectfully submitted,

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1168-121.AM1

1. (original) A method for concealing errors in texture partition of a video packet, comprising:
determining a particular macroblock within the texture partition where error is detected;
concealing the error starting at the particular macroblock;
evaluating image smoothness of concealed macroblocks;
repeating said concealing and evaluating with one more macroblock added prior to the previous particular macroblock, said repeating done until all macroblocks in the texture partition have been concealed; and
selecting a set of macroblocks, including a combination of decoded and concealed macroblocks, that produces best image smoothness.

2. (original) The method of claim 1, further comprising:
storing all decoded macroblocks of texture data in the texture partition up to the particular macroblock.

3. (original) The method of claim 1, wherein said concealing the error starting at the particular macroblock includes performing motion compensated temporal replacements of macroblocks starting at the particular macroblock

4. (original) The method of claim 3, wherein said performing motion compensated temporal replacements is done for those macroblocks whose motion vectors have changed

5. (original) The method of claim 1, wherein said evaluating image smoothness of concealed macroblocks includes computing smoothness of macroblock boundaries

6. (original) The method of claim 5, wherein said smoothness of macroblock boundaries is measured by summing pixel value mismatches between macroblock boundary pixels.

7. (original) The method of claim 6, wherein said summing pixel value mismatches includes storing partial mismatch values.

8. (original) The method of claim 6, wherein said summing pixel value mismatches includes summing squares of the pixel value differences.

9. (currently amended) ~~The method of claim 6,~~ A method for concealing errors in texture partition of a video packet, comprising:
determining a particular macroblock within the texture partition where error is detected;
concealing the error starting at the particular macroblock;
evaluating image smoothness of concealed macroblocks;
repeating said concealing and evaluating with one more macroblock added prior to the previous particular macroblock, said repeating done until all macroblocks in the texture partition have been concealed; and

selecting a set of macroblocks, including a combination of decoded and concealed macroblocks, that produces best image smoothness, wherein said evaluating image smoothness ~~summing pixel value mismatches~~ includes summing squares of the pixel value differences that weighs the pixel value mismatches between macroblocks belonging to different video packets differently.

10. (original) The method of claim 9, wherein the pixel value mismatches between macroblocks that belong to different video packets may be configured to weigh more than the pixel value mismatches between macroblocks that belong to same video packets.

11. (original) The method of claim 6, wherein said pixel value mismatches are computed by reusing the partial mismatch values from previous iteration.

12. (original) The method of claim 1, further comprising:
detecting the error in the video packet.

13. (original) The method of claim 12, wherein said detecting includes detecting invalid variable length code.

14. (original) The method of claim 12, wherein said detecting includes detecting inconsistent resynchronization header information.

15. (original) The method of claim 12, wherein said detecting includes detecting receipt of out-of-range motion vectors.

16. (previously presented) The method of claim 2, wherein said detecting includes DCT coefficient counts greater than a predetermined amount of approximately 64 pixels for a macroblock and Y/Cr/Cb pixel values out of range.

17. (original) The method of claim 2, wherein said selecting a set of macroblocks includes recovering some of the stored decoded macroblocks

18. (original) The method of claim 17, wherein said some of the stored decoded macroblocks include decoded macroblocks up to a macroblock that produced the best image smoothness.

19. (original) A method for concealing errors in texture partition of a video packet, comprising:
determining a particular location within the texture partition where error is detected;
concealing the error in texture data starting at the particular location;
evaluating image smoothness of the concealed texture data;
repeating said concealing and evaluating with one more texture data unit added prior to the previous particular location, said repeating done until all texture data units in the texture partition have been concealed; and

selecting a set of texture data units, including a combination of decoded and concealed texture data units, that produces best image smoothness.

20. (original) The method of claim 19, wherein said concealing the error in the texture data starting at the particular location includes performing motion compensated temporal replacements of texture data units starting at the particular location.

21. (original) An error concealment system for texture partition of a video packet, comprising:
an error location detector to receive video packets, and determine a particular macroblock within the texture partition where error is detected;
an error concealment element to conceal the error starting at the particular macroblock;
an image smoothness evaluator to evaluate the concealed macroblocks;
a selector to select a set of macroblocks, including a combination of decoded and concealed macroblocks, that produces best image smoothness.

22. (original) The system of claim 21, wherein said error concealment element includes a motion compensated temporal replacement element.

23. (original) The system of claim 21, further comprising:
a storage element to store all decoded macroblocks of texture data in the texture partition up to the particular macroblock.

24. (original) A computer readable medium containing executable instructions which, when executed in a processing system, causes the system to conceal errors in texture partition of a video packet, comprising:
determining a particular macroblock within the texture partition where error is detected;
concealing the error starting at the particular macroblock;
evaluating image smoothness of concealed macroblocks;
repeating said concealing and evaluating with one more macroblock added prior to the previous particular macroblock, said repeating done until all macroblocks in the texture partition have been concealed; and
selecting a set of macroblocks, including a combination of decoded and concealed macroblocks, that produces best image smoothness.

25. (original) The computer medium of claim 24, further comprising:
storing all decoded macroblocks of texture data in the texture partition up to the particular macroblock.

26. (new) The computer medium of claim 24, wherein the evaluating instruction includes summing squares of pixel value differences that weighs the pixel value mismatches between macroblocks belonging to different video packets differently.